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ABSTRACT

Problems involved in providing practical research experience in research methods courses are discussed. The two points in the research process where time is most critical are selecting measures and data collection. This paper suggests using a data base from previous research and having students conduct simulated studies based on randomly selected subjects from the data base. Two sample assignments from a doctoral level course at Utah State University are included to illustrate the use of this approach. In the first assignment, called the Team Research Project, a team of students from different courses is formed. The team studies the codebook of the data bank, sets up a problem statement and hypothesis, and conducts a computer search of the available literature. Each student reviews 1 year in the literature, randomly selects 30 or more cases from the data base, analyzes the cases, and writes a results section. The second assignment, called the Individual Research Project, follows very much the same pattern except that each student in the class goes through the entire process individually. (JAZ)

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Simulated Research Projects as a Means of Providing Practical Experience

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ABSTRACT

Problems involved in providing practical research experience in research methods courses are discussed. The author suggests using a data base from previous research and having students conduct simulated studies based on randomly selected subjects from the data base. Two sample assignments are included to illustrate the use of this approach.

Simulated Research Projects as a Means of Providing Practical Experience*

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I'm going to start out by telling you a little bit about an assignment that we tried for several years that was a failure, because I think there are some things that we learned from this failure. One of my beliefs is that people learn from their failures to which I attribute most of what I have learned having had more than a few failures.

The problem of giving students anything that really approaches practical research experience has always been a very tough one in the research methods courses. It is probably more difficult in our courses than most because our university is on a quarter system, which means you have ten weeks to get from one end of your course to the other. Those of you that have experienced the quarter system know that that doesn't give a great deal of time. In the assignment that we tried out for several years in hopes of making it work we had students work as a group on a small scale research project. They identified a problem, stated the hypotheses, did a literature review, developed procedures, collected data, analyzed results and prepared a report. On problem identification, hypotheses, procedures, and analysis, the students worked together. For the literature review we had each student search the literature for one year and do a literature review for that single year on the topic of the study. They then pooled the findings that emerged from these one year searches into a brief review. For the data collection phase each student collected a certain amount of data. For example, if data collection involved collecting study methods test scores for 20 sixth grade children from each of

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three racial groups, each student in the class would administer an equal number of tests to obtain the total of 60. The data were then pulled together and as a group the students did the analysis and wrote their report.

The problems we had with this assignment were basically problems with time but I can be even more specific and say that the two points in the research process where time was most critical were selecting measures and data collection. Data collection is usually the most time consuming part of the typical research project and with only ten weeks we found that the students were planning and carrying out rather shallow surveys of various campus issues, that I didn't think were contributing very much to their education. The measurement problem is usually difficult in a survey because you have to put together a measure and as you know it is easy to put together a poor questionnaire and hard to put together a good one. However, regardless of the type of research students worked on, we found that either locating or developing appropriate measures was far too time consuming to be done adequately during the ten week quarter.

After trying this assignment for two or three years, I finally had to give up on it, on the grounds that what I was really doing was teaching my students how to do bad research. Most of them can do bad research without being taught so I felt that something better had to be done. In an attempt to overcome the problems encountered in the aforementioned assignment, I decided to develop assignments calling for simulated research projects using data that were already available. The first data base that I used in these assignments was based on an ability grouping study I did many years ago involving a longitudinal study of 5,000 students who were tested two or three times a year for four years. I recently switched to another data base that I'll tell you

about shortly. First, however, I would like to point out that setting up simulated research projects using an available data base has some very important advantages. In my opinion these assignments give the students a maximum amount of practical experience with a minimum investment of student time.

The data base we are now using is the data from the High School Seniors Cohort Study of 1965 and 1973. This study was carried out by the University of Michigan Institute for Social Research. These data were collected on all seniors from a large number of high schools in 1965 and again substantially the same high schools in 1973. There were about 20,000 students in the 1965 data base and nearly 17,000 in the 1973 data base. Data were collected on 115 variables on the '65 sample and 141 variables on the '73 sample. These include things like data on social and political climate, attitudes toward school, school activities, personality, academic background, occupational plans, family background, personal background and school characteristics. Thus, students have available a large number of variables that can be used as independent variables, a large number that can be used in dependent variables. In using this type of assignment you need a fairly large number of variables because when working with this kind of data base the students have to select a hypothesis which can be tested with the data available. In other words, one of the constraints is that students have to design their study around, is that there have to be appropriate subjects, and measures in the data base to provide the data needed to test whatever hypothesis they select. So this obviously restricts what the students can do. Thus, the bigger the data base and the more variables it contains the less restrictions are placed on your students.

There are quite a few possibilities with the data base we are now using. You can compare students from different schools where you are essentially using school characteristics as independent variables. You can compare students from the same school where the students themselves have different characteristics. You can also compare the '65 students with the '73 students and you can study different combinations of school characteristics, cohort characteristics and student characteristics. Thus, there are a lot of different kinds of designs that can be stimulated with a large data base of the sort we are using.

I want to tell you a little bit about the two assignments for which the data base is used. First, let me mention that these assignments are used in our doctoral level research methods course. At Utah State University, when students come into this course, they've already had a master's degree course in research methods, in which Borg and Gall Educational Research is used as the textbook. In the doctoral level course I have never been happy with any of the available textbooks. We mainly use journal articles in that course, but we also use two or three chapters out of Cook and Campbell Quasi-Experimentation. In addition to the basic research methods course our doctoral students also complete three courses in statistics. One is the usual undergraduate course, followed by a course in inferential statistics and a course in correlational methods. The inferential course is almost entirely concerned with ANOVA and ANCOVA. The course in correlational techniques is primarily concerned with multiple regression analysis. So, the doctoral students come in to the research course with a pretty fair background which means that there are a lot of research design and analysis options open to them in what they do in the simulated research assignments.

The first assignment we call The Team Research Project. If you have a copy of that at hand, you may want to glance at it as I talk about it. All students who are working on a doctorate in the College of Education have to take this course so we get people from a variety of different departments. I usually set up the teams myself in such a way that we have as wide a mix of backgrounds as possible on the team. Typically a team will include a student out of Special Education, one out of Psychology, one out of Elementary Education perhaps, and one out of Business Education or something of this nature. Once the teams are set up, the first thing they have to do is study the code book for the data bank itself so that they know what data are available. Then they get together and as a group, they set up their problem statement and hypothesis. They can test several hypotheses, if they see fit to do so. You can see that some of these features are taken from the earlier assignment which did not work out; this one has worked out quite well. Once a problem has been defined, the students each review one year in the research literature. I have an agreement with the library that permits them to do preliminary computer searches of ERIC or whatever data base the students want to use for half price. This usually means that each student contributes only 2 or 3 dollars, so I do encourage them to do computer searches. After the preliminary search, each person will read and prepare notes on just one year of the research literature. Then they get together and put their notes together into a very brief review. Once they have developed their hypotheses and done their search, they are required to locate a journal that has published work in that area. Of course, they can select a journal rather easily by checking their computer search. When the report is turned in on this assignment it has to be in the format of the selected journal, which gives students a bit of additional experience that I think is worthwhile.

When we get to the data collection phase each student randomly selects thirty or more cases from the data base and writes down the scores of those subjects on whatever variables are relevant to the simulated research problem. Each student then runs a separate analysis on his thirty cases and writes his own results section. This has the advantages of requiring the students to do a little statistics. Also, one of the things that often emerges from this is that every student does not get the same results. It is one of the ways that you can impress upon students the fact that just because a difference is significance of 5% level doesn't rule out the possibility of a Type I error. Very often with samples of 30 there will be three students who may get a significant result and one who will not get a significant result. So this is essentially the way the team research project is carried out.

The Individual Research Project assignment follows very much the same pattern except that this time each individual in the class has to pick out a topic and write a hypothesis, decide which measures out of the data base he will use and draw a sample of about thirty cases. If the student selects a factorial design more than thirty cases are needed. Then students go to the data base and copy out the scores that they need for the cases they've selected. On the individual research assignment I do not require a literature review because in this case each student is working on a different topic. I've felt that having them do a literature review on their individual assignment required more time than was commensurate with what they'd get out of it, having already had the experience in the team research project. Again, however, students select journals that would be appropriate for their particular topic. They write their report in this assignment, leaving out the literature review section, in the format of a journal article. These reports

are typically four to ten pages in length and include everything that goes into the typical journal article except the literature review and the references.

These two simulated research assignments are obviously a little different than actually doing research. They differ mainly in that students are limited to topics that can be studied using the data base and instead of spending two or three weeks to collect their data, (which happened when the students were actually having to do research projects) they can get their data out of the data base in thirty minutes. Thus, data collection is no longer the burden it was in our earlier assignment.

I call these "simulated research assignments" but many of you have probably noticed that there are more and more articles in the literature that are based on secondary analysis of data that is not greatly different from the data that we are using in these assignments. So one of these days, I'm hoping to get a data base that hasn't been massaged too much with the idea that perhaps students can take the next step which would be to actually submit their article to the journal after they have gotten the data out of the data base.

As I mentioned earlier, these two assignments work quite well, and I wouldn't hesitate to recommend them. If you are on a semester system, you will find they work better than they do in a quarter system but you can easily squeeze one into a quarter system class. Since I believe our students are better prepared than most on statistics and research methods, I use both of these in my doctoral level course. Students do the group assignment during the first five weeks and then they go ahead and do the individual assignment during the second five weeks.

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ASSIGNMENT 1
TEAM RESEARCH PROJECT
INSTRUCTIONS

Spring 1986 Revision

1. The class will be divided into groups of 3-4 students.
2. Each group will review the data bank and Code Book (copies available on reserve) and identify a research problem that can be studied using the data bank. They will agree on the measure(s) to be used, the hypothesis to be tested, and subjects to be sampled. In order to do this, it is necessary to study the Code Book very carefully (Jennings, M.K. High School Senior Cohort Study, 1965-1973).

Study the description of the variables, the codes, and the questionnaire, for 1965, 1973, or both, depending on your research problem. There is a Code Book at the Reference Desk and another on reserve. One copy of the data file printout is also on reserve.

3. Each student will review the research literature for a one-year period and prepare note cards on the most important studies (usually not more than 5) relevant to their hypothesis or research problem.
4. Students will combine their note cards, discuss the research, select the most important and relevant 5 to 10 studies from the 3-4 years they have reviewed.
5. Students will select an appropriate journal and will work together in drafting the problem statement, the review of literature and a brief "methods" or "procedures" section and "reference" section following the format of the selected journal. Procedures section should describe design, sample, and measures, including reliability coefficients, and validity evidence.
6. Each student will independently draw a random sample of at least 30 subjects from the data bank. Each student should start at a different point in the Table of Random Numbers so that no two students will draw the same sample. For each subject you select, record the data needed to test the hypothesis.
7. Each student will independently analyze the data for his/her sample and will prepare his/her own "Results" section of the article. If a "Conclusion" section, an "Abstract" or a "Discussion" section is usually included in the selected journal, he/she will also prepare these.
8. Each group will then combine the sections of the article prepared by the group with the sections each student has prepared independently, edit, and prepare the final manuscript. This manuscript should be typed double spaced on bond paper and should be free of errors. The team's article should be submitted with the different Results sections (re one for each student) appended to the parts developed by the group.
9. Some class time will be provided during the quarter to allow groups to discuss this assignment and carry out the group work. However, most work must be carried on outside of class.
10. All team members will receive the same grade for the parts of the study conducted jointly plus an individual grade for the sections each student has done independently.

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ASSIGNMENT 2
INDIVIDUAL RESEARCH PROJECT
INSTRUCTIONS

Spring 1986 Revision

1. Study the data bank book and try to develop a problem that permits using a factorial design with one dependent variable. For example, your independent variables could be sex and time of study (re 1965 vs. 1973) and your dependent variable could be faith in government (re variables 26 - 27 in the code book).
2. Select a measure to be used for the dependent variable.
3. Randomly select a sample of at least 10 subjects for each cell in your factorial design, or select at least 30 cases if you do not use factorial design.
4. Using the data printout, obtain scores for the selected subjects on the dependent variable, and record these on a hand data sheet.
5. Carry out a two-classification ANOVA or ANCOVA, whichever is appropriate and incorporate data into a short table, or use other statistical procedures as appropriate.
6. Select the journal that will be the model for your format, and prepare a brief article on your study. Although journal formats differ, most journal articles include the following sections:
 - a. Brief introduction and statement of problem.
 - b. Review of literature - OMIT FOR THIS ASSIGNMENT.
 - c. Statement of hypotheses and alpha level.
 - d. "Methods" or "procedures" section. This should be brief for this assignment, but should include a description of measures, independent variables, sampling procedures, and design.
 - e. "Results" section (most important in this assignment).
 - f. "Discussion" section (some journals include discussion as part of results; others make "discussion" a separate section).
 - g. Either an abstract at the beginning of article or summary at the end.
 - h. Reference list - OMIT FOR THIS ASSIGNMENT.
7. The manuscript of your article should be typed double spaced on plain bond. Proofread your manuscript carefully and correct errors. Whiteout or erasures may be used. You will be penalized for poor sentence structure, grammatical errors, spelling errors, etc. This paper should be an example of the best work you can do.